① $-(-x-1)-(-1-x)=-3$

$x+1+1+x=-3$

$2x=-3-2$

$2x=-5$

$$\boxed{x=\frac{-5}{2}}$$

② $\frac{-(x+1)}{3}+\frac{2}{3}(x-4)=\frac{3}{4}$

$\frac{-x-1}{3}+\frac{2x-8}{3}=\frac{3}{4}$

$\frac{-4x-4}{12}+\frac{8x-32}{12}=\frac{9}{12}$

$-4x-4+8x-32=9$

$4x=9+4+32$

$4x=45$

$$\boxed{x=\frac{45}{4}}$$

③ $\frac{3}{5}(2x-3x)+\frac{x-4-7x}{3}=\frac{-3(2x-4)}{5}$

$\frac{-3x}{5}+\frac{-6x-4}{3}=\frac{-6x+12}{5}$

$\frac{-9x}{15}+\frac{-30x-20}{15}=\frac{-18x+36}{15}$

$-9x-30x-20=-18x+36$

$-9x-30x+18x=36+20$

$-21x=56 \longrightarrow \boxed{x=\frac{-56}{21}}$

④ $(x-1)^2-(x+1)^2=(x+2)(x-2)$

$x^2-2x+1-(x^2+2x+1)=x^2-2x+2x-4$

$x^2-2x+1-x^2-2x-1=x^2-4$

$-4x=x^2-4$

$x^2+4x-4=0$ $\begin{cases} a=1 \\ b=4 \\ c=-4 \end{cases}$

$x=\frac{-4\pm\sqrt{4^2-4\cdot1\cdot(-4)}}{2\cdot1}=\frac{-4\pm\sqrt{16+16}}{2}=$

$=\frac{-4\pm\sqrt{32}}{2}$ $\begin{cases} x_1=\frac{-4+\sqrt{32}}{2} \\ x_2=\frac{-4-\sqrt{32}}{2} \end{cases}$

⑤ $\frac{(-x-2)^2}{6}-\frac{-x^2+5}{3}=\frac{1}{2}(x+3)$

$\frac{x^2+4x+4}{6}-\frac{-x^2+5}{3}=\frac{x+3}{2}$

$\frac{x^2+4x+4}{6}-\frac{-2x^2+10}{6}=\frac{3x+9}{6}$

$x^2+4x+4+2x^2-10=3x+9$

$x^2+2x^2+4x-3x+4-10-9=0$

$3x^2+x-15=0$

$\left.\begin{matrix} a=3 \\ b=1 \\ c=-15 \end{matrix}\right\}$ $x=\frac{-1\pm\sqrt{1^2-4\cdot3\cdot(-15)}}{2\cdot3}=\frac{-1\pm\sqrt{1+180}}{2\cdot3}=$

$=\frac{-1\pm\sqrt{181}}{6}=$ $\begin{cases} x_1=\frac{-1+\sqrt{181}}{6} \\ x_2=\frac{-1-\sqrt{181}}{6} \end{cases}$

⑥ $2x^2 - 3 = 25$

$2x^2 - 3 - 25 = 0$

$2x^2 - 28 = 0$

$\left.\begin{array}{l} a = 2 \\ b = \emptyset \\ c = -28 \end{array}\right\}$ $x = \pm\sqrt{\frac{-c}{a}} = \pm\sqrt{\frac{-(-28)}{2}} = \pm\sqrt{\frac{28}{2}}$

$= \pm\sqrt{14}$ $\Leftarrow \begin{array}{l} x_1 = +\sqrt{14} \\ x_2 = -\sqrt{14} \end{array}$